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THE STATE FORESTER'S REPORT 1972





State of California
RONALD REAGAN, *Governor*

Resources Agency of California
NORMAN B. LIVERMORE, JR., *Secretary*

Department of Conservation
RAY B. HUNTER, *Director*

The State Forester's 1972 Report



L. A. MORAN, *State Forester*

Board of Forestry

Whitford B. Carter, *Chairman*
Howard K. Nakae, *Vice Chairman*

Franklin L. Barnes, Jr.
C. Robert Barnum
Ray Crane

E. Lamar Johnston
Waller H. Reed
Markham E. Salsbury

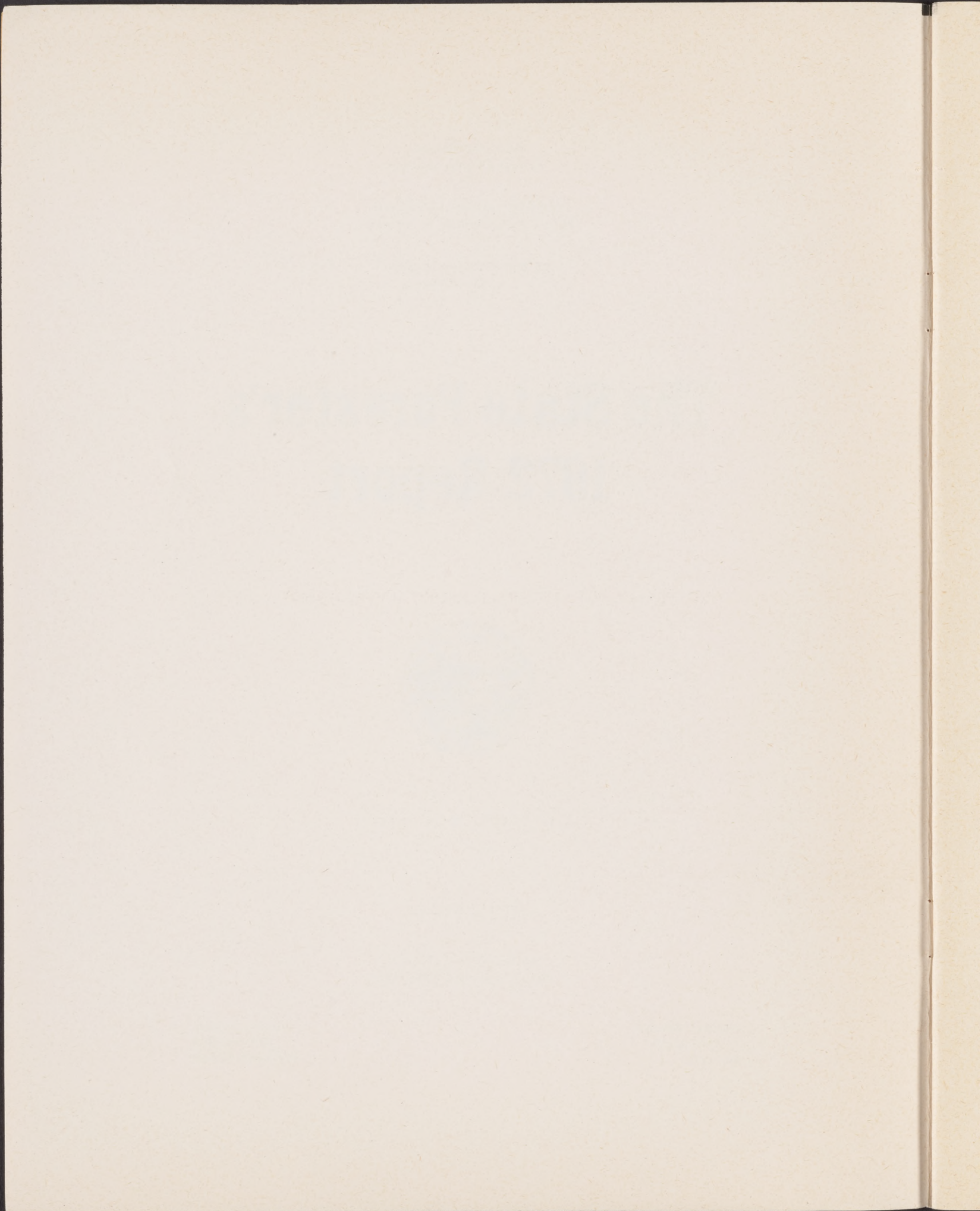


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Ray B. Hunter, 46, was appointed director of the Department of Conservation on September 25, 1972. Hunter began his state service in 1967, as legislative assistant to the Secretary of Resources. Later that year, he was named deputy director of the Department of Parks and Recreation and in 1969 he was promoted to chief deputy director.



Lewis A. Moran, 55, was appointed state forester on February 1, 1971. He joined the Division of Forestry in 1938 as an assistant ranger and moved through the ranks of associate ranger, forest technician, assistant deputy state forester, deputy state forester, and chief deputy (1959-1971).



On February 10, 1971, Larry E. Richey was appointed chief deputy state forester. Richey joined the Division of Forestry in 1941 as a fire fighter. Following three years in the Marine Corps, he completed his education at the University of California and rejoined the Division. In 1959, Richey became assistant deputy state forester in the North Coast District where he served until his promotion to chief deputy.

Executive

Training Activities

In 1972 more Division employees participated in academy training than ever before in history. Nearby ranger unit facilities were used on several occasions to house the overflow of students. Plans to build more barracks were included in the proposed 1973-74 budget.

Plans for a 40-hour firefighter field training course were completed and will be implemented in the 1973 fire season. Proposed large fire management and service boss courses are almost completed. Pilot courses are scheduled for the spring of 1973. Courses in initial attack and extended attack fire management were revised to include additional simulation exercises.

A three-week dispatcher training program was developed and the first pilot session was held during the year. Training aids included a functioning dispatch center, where students practiced new dispatch procedures recommended by the 1971-72 Dispatch and Command Task Force Study.

A pilot session of the supervisory management training course for Fire Captain and State Forest Ranger I personnel was conducted in the Southern California District.

The first five-week fire control training course was conducted at the Fire Academy in January of 1972; thirty career opportunity development trainees participated. Studies included preparation for general education equivalency tests, as well as special fire control training. All students passed the course and returned to their units for further on-the-job training.

The Fire Academy staff expanded their initial Attack Fire Analysis Project during the 1972 Fire Season. Data was obtained on 20 more initial and extended attack fires and the findings were consolidated in a report to the Fire Control Section.

Highlights of Academy training activities for the year include:

- 5 standard basic fire control courses—3,745 man days
- 1 career opportunity development trainee special basic fire control course—880 man days
- 1 heavy fire equipment operator course—240 man days
- 1 initial attack fire management instructor course—65 man days
- 3 extended attack fire management courses—190 man days
- 3 plans boss courses—185 man days
- 13 fire prevention and law enforcement courses—2,670 man days
- 3 fire crew foreman-correctional officer supervisory courses—175 man days
- 1 equipment maintenance foreman course—185 man days

- 1 communication officers course—140 man days
- 1 pilot dispatchers training course—75 man days
- 1 air conditioning maintenance course—85 man days
- Total: 8,635 man days

Special training assignments for Division personnel included participation in the following programs sponsored by other public agencies, colleges, and private concerns:

- California Fire Services Staff and Command School
- Arson and Fire Seminar
- Fire Department Management Seminar
- Remote Sensing of Forest Lands
- Environmental Impact Report Writing
- Time Management

A variety of technical and managerial courses offered by the State Personnel Board Management Development Institute.

The total training effort arranged by program, including training at all levels in the organization for both permanent and seasonal employees, is as follows:

- Fire Prevention—4,110 man days
- Fire Control, state responsibility—32,736 man days
- Fire Protection, local government—24,336 man days
- Forest, Range and Watershed Management—393 man days
- Conservation Camps—3,624 man days
- Ecology Corps—325 man days
- Civil Defense and Other Emergencies—135 man days
- General Support—1,820 man days
- Total: 67,479 man days

Safety and Accident Prevention

The number of people injured in the Division of Forestry declined in 1972, as shown in the following chart. The injury frequency rate increased, however, because of fewer hours of exposure time.

Yearly Injury Rate of Division of Forestry Personnel

Calendar Year	Lost Time Injuries Per Million Hours Exposure	Lost-Time Injuries
1966	42.9	316
1967	45.9	302
1968	22.1	265
1969	21.6	262
1970	20.7	276
1971	25.1	191
1972	26.4	189

For the first time in six years there is a new district winner for the lowest injury rate—South Sierra District with a rate of 21.4 lost-time injuries per million hours of exposure.

In 1972 the Division provided more safety equipment for the protection of workers. Plans were made to spend \$700,000 over a three-year period to provide all fire trucks with turn-out coats and self-contained

breathing apparatus. More hydraulic lift gates will be installed on stake-side trucks to reduce the potential for back injuries in loading and unloading heavy materials. A study of the Nomex jump suit was concluded, but no policy was established.

A physical fitness program was begun during the year, but progress was slow. Problems arose in providing medical clearance for workers age 40 and over, and in managing workers found to be "unfit" for exercise, or in some cases for work. Hopefully, most employees will be included in the program before the 1973 fire season.

The Division's good driving record improved in 1972. The record for the last six months of the year was 5.07 accidents per million miles driven.



Ranger Lee Sherman, San Benito-Monterey Unit, is wired for tests to measure his pulse rate, heart rate, and blood pressure, as part of the Division's new physical fitness program.

Program Planning

New legislation and changes in personnel assignments resulted in a redirection of the Division's planning program. In previous years, Planning Coordinator Paul Cox had worked on loan and under contract to protected waterways studies. SB 1285 (Collier), enacted in 1972, authorized detailed management plans for many rivers in northwestern California. The Resources Agency responded to this legislation by forming an interdisciplinary planning team to prepare the plans. On July 1, the Planning Coordinator became a member of this team on a full-time, contract basis.

Late in the year, the Wild and Scenic River System Act was passed by the Legislature and signed by Governor Reagan. The river plans required by this legislation were also assigned to the Agency planning team. As the workload associated with subdivision review and environmental impact assessment increased, a Program Planner position was established and Forester Franklin Frank was appointed to the position. Subsequently, the California Environmental Quality Act of 1970 was interpreted by the State Supreme Court (*Friends of Mammoth vs. Board of Supervisors of Mono County*) to apply to private as well as public projects. This led to further legislation (AB 889—Knox) that mandates Division of Forestry participation in the environmental impact assessment process to a much greater degree than was previously required. As a result, the Division's planning efforts were directed toward meeting the immediate needs associated with environmental protection and impact assessment. The Division's Program Planner was active as chairman of an ad hoc committee, appointed by the State Forester, to develop guidelines for the preparation and review of internally and externally generated environmental impact reports. This new program may require considerable change in the Division's operations.

Committees

The Program Planner served on various internal committees and interagency study groups, including: the Steering Committee for review and design of emergency fire dispatching systems, in conjunction with the Systems Development Corporation; the Emergency Activities Reporting System Committee formed to update the Division's emergency activities data collection system; the pilot test program to evaluate the application of NASA-U-2 photography for the collection of fire intelligence data; the ERTS Resources Technology Satellite (ERTS-A) Project to investigate the application of investigator remote sensing data to the Division of Forestry's programs and operations; and, the Land Use Study Team, organized by the Office of Planning and Research to assist in the preparation of the State Development Plan.

Cooperative Planning

Several state and federal cooperative planning projects begun in previous years were continued and coordinated during 1972. The Housing and Urban Development (HUD) grant project, to analyze fire protection systems, the relation of wildland protection to structural protection, and potential fire services standards, progressed according to schedule. Maps showing hazardous fire areas were drawn and incorporated in the Governor's Environmental Goals and Policies Report. The HUD Study Team also provided state and local government agencies with information about land use planning and wildland fire protection.

A grant from the State Water Resources Control Board supported a project to provide data related to watershed conditions, fire protection, sedimentation and wildland soil conditions for the State Water Quality Control Plan. A detailed report was completed

during the year and sent to the State Water Resources Control Board.

Economic, forest resource, and timber products planning in the North Cal-Neva Resource Conservation and Development Project continued according to plan. The full-time Division Forester assigned to this RC&D project defined additional economic data and assisted local government in the development of forest resources.

A HUD grant proposal was written for a pilot wildland environmental planning project. The project will help regional and local governments in promoting plans for the development of environmental programs and in the development of conservation and open space elements of county general plans.

Special Projects

The Planning Coordinator served on a joint federal-state planning team formed to assist Tulare County as authorized by State Resolution 202. This team consulted with Tulare County Planners to provide interim guidelines for the preparation of an environmental resources management element of the County General Plan. Ranger Robert McDonald was assigned to work directly with the Tulare County Planning Office to test the feasibility of this type of county/state cooperation. The Environmental Resources Management Element is a comprehensive document designed to coordinate conservation, open space, scenic highway and recreation components of city and county general plans (required by state law). The completed draft of this report was reviewed.

Two land use planning seminars were held in cooperation with the U.S. Forest Service and the University of California at Davis and Berkeley. Participants included foresters, planners, and administrators from the Division, U.S. Forest Service, local and regional government, and private organizations. The problems of wildland use and associated environmental concerns were discussed. Evaluation showed that the purpose of the seminars, to increase management personnel's awareness of planning and environmental problems, was achieved. Further training or seminars were postponed until the legal, environmental, and planning guidelines were clarified.

The Planning Coordinator assisted the State Forester during the hearings, passage and final enactment of AB 469 (Z'berg, et al.), which established a procedure for the registration or licensing of foresters under the

State Board of Forestry. This legislation should have a great impact on the professional standards and performance of foresters and is proposed as a method of improving the Forest Practice Act.

The Planning Coordinator served as a consultant to a Department of Conservation team studying personnel practices, including wages and hours, work weeks and related matters. Interpretation of staffing standards, fire plan requirements and projected manpower needs were given to the committee.

Planning services were provided to the engineering staff to aid them in developing a statewide atlas system to replace the present administration map series. The Program Planner devoted a great deal of time to assisting local and regional governments in special interagency land use planning projects. The Division participated in special resources studies in Sonoma, Mendocino, Butte, Placer and Nevada Counties.

Environmental Impact Assessment and Legislative Review

Over 300 environmental impact reports for public projects and subdivisions were reviewed. The more important proposals included: Dams at Auburn and New Melons, Wilderness areas at Yosemite National Park, Trinity Alps, Monarch, and Minarets, and U.S. Forest Service Timber and Vegetative Management Plans.

Several state and federal laws were enacted that affected the Division's programs and activities. These laws were analyzed to determine the extent of their impact. The new state requirements included, the Coastal Protection Measure, Land Use and Zoning Legislation, and the Protected Waterways laws. Federal legislation included the Rural Development Act, termination of the Rural Environmental Protection Program, and various wilderness proposals. Additional studies and analyses were made for pending federal and state legislation, including: national timber policy proposals, timber export limitation, the State Forest Practice Act, and proposed state legislation on open space, regional planning and Lake Tahoe.

The Program Planner reported to the Board of Forestry on matters related to the California Environmental Quality Act, and spoke to the State Resources Conservation Board on the impact of watershed damage by the Romero and Molera fires. He also attended several conferences and training sessions on land use and environmental problems.

Board of Forestry



Whitford B. Carter—Chairman



Howard K. Nakae—Vice Chairman



Franklin L. Barnes, Jr.



C. Robert Barnum



Ray Crane

The Board of Forestry consists of eight members appointed by the Governor for staggered terms of four years each. It is charged by the Public Resources Code to "... represent the State's interest in the acquisition and management of State Forests as provided by law and in federal land matters pertaining to forestry, and in the protection of the State's interests in forest resources on private lands ..."

In 1972 the Board was given the added responsibility of administering the Professional Foresters Licensing Law, "... to provide the regulation of persons who practice the profession of forestry and whose activities have an impact upon the ecology of the wildlands and the quality of the wildland environment, ..."

Two Board members were reappointed: E. Lamar Johnston, first appointed in 1971 to fill the unexpired term of Paul Augignac, and Howard Nakae, first appointed in 1968.

The Board held 12 regular monthly meetings and one special meeting in 1972. Meetings in Santa Barbara, Fresno, Clear Lake, Corning, and Oakland were highlighted by field trips, acquainting Board members with local interests and problems, as well as information on current conditions in the wildland areas. The meeting in Oakland provided a detailed look at forestry research under study at the University of California and the Pacific Southwest Forest and Range Experiment Station. Individual members of the Board also attended meetings and conferences on forestry and conservation and participated in Timber Maturity Board meetings in several counties.

A 1971 court decision invalidated parts of the Forest Practice Act, leading to the passage of Senate Bill 183, which authorized the Board to adopt temporary Forest Practice rules pending the enactment of new legislation. The Board met in special session on June 30, 1972 and adopted temporary rules effective for a period of 180 days. At the end of this period, no alternate plans of Forest Practice had been approved and the temporary rules were renewed for an additional 120 days.

The Board approved a request to transfer Loghry State Forest to the Department of Parks and Recreation.

They also reviewed the budget, the impact of the Environmental Quality Act on division programs, and other legislation related to forestry matters.



E. Lamar Johnston



Waller H. Reed



Markham E. Salsbury

Management Services

The Management Services Section of the State Forester's staff provides essential assistance and service to other staff sections in developing management plans and carrying out managerial activities. Areas of responsibility include: collecting and analyzing data, estimating costs, planning and preparing budgets and supporting optimum use of resources—especially manpower. Management Services also assists and provides guidance in purchasing, and storing supplies and equipment, and in managing property and records.

The total number of permanent employees in the Division of Forestry as of December 31, 1972 was 2,796. Seasonal employment during the summer fire period increased the number of employees to 4,649.

The inmate population assigned to conservation camps continued to decline, prompting a campaign to increase the enrollment in the Ecology Corps program. A new Federal Public Employment Program filled 293 positions, mainly in the fire-fighter class. Together these employees provided valuable fire protection and performed a wide range of station maintenance duties.

A special project, established to revise and update the Division's wildland mapping program provided 22 new positions.

Specifications were revised for two Forestry series, Foresters and Fire Prevention Officers. Specifications were also modified for the Fire Control Aid class to enhance its potential as an entry class into civil service Forestry careers. The Division's air program received new emphasis with the reclassification of two positions, Chief Air Operations Officer and Air Operations Officer, and the establishment of a third, Assistant Air Operations Officer.

Legislation passed during 1972 provided an equable allowance for all uniformed personnel. All classes of forestry personnel gained an average 12½ percent salary increase in July and some State Forest Ranger I positions enjoyed an increase of 22½ percent.

A Materiel Unit was established and organized within the Management Services Section of the State Forester's office. From field reports, personnel in Materiel compiled an expendable inventory consisting of stock numbers, descriptions, units of measure and current prices. From this, a computer printout was developed in stock number sequence. Included in the printout were all items formerly called minor equipment and expendable—accountable. The printout was duplicated and returned to the field for an inventory update to establish a solid baseline necessary for managing all materiel. The total volume of individual line items was approximately 8,000.

Considerable progress was made in the following: decentralizing and streamlining procurement procedures, simplifying property nomenclature, and rewriting the old Purchase Manual Instructions into a complete Materiel Handbook.

To facilitate the final formulation and implementation phase of the system, the MMS Study Task Force was expanded to include all district business managers and the Division property officer.

During 1972, 1,022 excess federal property transfer orders were processed. The federal government's acquisition cost of items acquired by the Division of Forestry during the year was \$2,736,000. The cost to the State for those items obtained under the 20 percent reimbursement category totaled \$4,580.50.

A major change in managing appropriations occurred when the Division allocated operating expense funds to each field unit. More responsive administration is expected since local managers will have control over both funds and expenditures. Data print-outs and monthly base reports will keep field managers alert to trends and permit them lead time in adjusting program expenditures so as to remain within basic guideline allotments.

A review of the Division's Mountain Top Management Program begun in 1972, will be mainly concerned with communication facilities, including: sites, buildings, utilities, tenant occupancy, rental rates and access roads. The review will focus on status of the physical plant, uniformity of administration, and an economic analysis of the program.

Fiscal Year Budget—1972-73

Summary:

(1) Fire prevention: state responsibility.....	\$2,937,435
(2) Fire control: state responsibility.....	36,928,384
(3) Fire protection: local government contract.....	11,791,081
(4) Forest, range and watershed management.....	2,537,271
(5) Conservation camp.....	4,113,145
(6) Ecology Corps.....	1,484,421
(7) Civil defense and other emergencies.....	120,759
(8) General support.....	4,660,137

Sub-Total.....	\$64,572,633
Reimbursement.....	-16,020,458

TOTAL NET BUDGET.....\$48,552,175

Program Changes

1. Increase in the effectiveness of the fire control element.	
a. Establishment of four additional heli-tack stations to meet fire attack needs in problem areas.....	106,000
b. Assuming direct fire protection of 580,000 acres previously protected by the U.S. Forest Service.....	390,000
2. Fiscal resources redirected to accomplish above programs.	
a. Closure of six fire stations.....	-317,000
b. Change in U.S. Forest Service contract fire protection allotment since area protected was reduced.....	-118,000
c. Diversion of equipment funds to cover one time equipment costs for helitack crews.....	-61,000
3. A salary increase was authorized by the Legislature and approved by the Governor in recognition of identified salary deficiencies.....	3,900,000

Retired Employees

The following employees retired in 1972:

Jack E. Amundsen, State Forest Ranger II
William L. Aultman, Fire Apparatus Engineer
Walter L. Banchero, State Forest Ranger I
George W. Barnhill, State Forest Ranger I
Clarence Brown, State Forest Ranger II
Howard V. Burnett, Heavy Fire Equipment Operator
John W. Carpenter, Forestry Cook I
Earl R. Chaney, Fire Crew Foreman
Frank Coffeen, Fire Apparatus Engineer
Louis Gerlinger, Fire Prevention Officer V
Margarette E. Gustin, Clerk Typist II
Marion B. Hall, State Forest Ranger I
Herman G. Hammack, State Forest Ranger I
Pansy Hopkins, Stenographer II
Thomas Huffstutler, Forestry Cook II
Karl A. Jaeger, State Forest Ranger I
William A. Jamieson, State Forest Ranger IV
Herbert B. Kaufner, Assistant Deputy State Forester
Darrel D. Kirkman, Fire Captain
Donald E. Knowlton, Deputy State Forester
A. L. Lester, Fire Apparatus Engineer
Lynwood L. Lindley, Fire Crew Foreman
John S. Lockhart, State Forest Ranger IV
Robert G. Marshall, State Forest Ranger I
Earl A. Mason, Fire Crew Foreman
Herman P. Meyer, Forester III
Bennie F. Miller, Fire Captain
James W. Miller, State Forest Ranger III
Roy Moore, Carpenter I
Charles F. Mund, Heavy Fire Equipment Operator
Stephen Nash-Boulden, Associate State Forest Ranger
James C. Orr, Fire Crew Foreman
Alfred J. Paloska, Fire Captain
Georgette C. Pantages, Clerk Typist II
Wilfred Patterson, Fire Captain
Dorothy Lois Quaney, Stenographer II
George D. Reid, Fire Captain
Mark E. Sharer, Equipment Maintenance Foreman
Ted E. Vieu, Fire Captain
Wayne W. Walkley, Heavy Fire Equipment Operator
Frank J. Williams, Fire Captain
Edd O. Wright, Fire Crew Foreman
James A. Younghusband, Fire Captain

Engineering and Camp Programs

The primary responsibilities of engineering are establishing and maintaining standards, and performing work related to land acquisition, mapping and surveying, graphics, and the design, construction, and maintenance of facilities.

Land Transactions

Site acquisition processing was completed for the following: Mt. Bielawski Lookout in Santa Cruz County, a thirty-one acre addition to Boggs Mtn. State Forest in Lake County, Dulzura Forest Fire Station in San Diego County, and an addition to the Davis Equipment and Nursery complex in Yolo County. In addition to this real property the division received a Certificate of Transfer from the Forest Service for the Eagle Peak Lookout buildings in Tehama County.

During the year 96 right-of-way agreements and 47 land agreements were processed; 89 other agreements were terminated.

Facilities

A major capital outlay combination barracks-mess hall-equipment building was completed at San Juan Capistrano in Orange County. The structure was designed in keeping with the historical nature of the community.

Utilizing minor capital outlay funds, office additions were completed at Mariposa and St. Helena, and barracks replacements were completed at the Antelope and Paskenta Forest Fire Stations. Office remodeling took place at the Ranger Unit Headquarters in Perris and a barracks air-conditioning project was completed at the Orange Ranger Unit Headquarters.

Additional projects completed in 1972: water system improvements at Burrell, Hollister, and Campo Forest Fire Stations, replacement of a water system for Ranger Unit Headquarters at Mt. Danaher, more water system controls at the Alder Conservation Camp, a concrete water tank for Parlin Fork Conservation Camp, a replacement cab for the Sunset Lookout Station, access improvements at Sutter Hill Forest Fire Station, a new cone conveyor system for the Davis Nursery, and several radio repeater vaults for use statewide. Fire defense improvements included the completion of 8 segments of a fire break on the Escondido Creek project.

Maintenance of structures occupied a great deal of time and effort because of the age and increased number of facilities. Several maintenance training courses were initiated and maintenance standards were further developed.

The Division's fire access truck trail system remains at 3,897 miles plus 4,403 linear feet of bridges. Power lines and telephone lines also remained static at 6.8 and 730 miles respectively.

Drafting and Graphic Arts

The Delineation and Graphics Unit handled 389 job requests during the year. A new State of California base map was prepared and considerable time was spent preparing maps for the new Fire Control Dispatch Program. Also a new filing system was set up using a map number for the USGS Quads.

A special administrative mapping program began on March 6, 1972. This program will provide the division with up-to-date, detailed administrative maps to be made available to other governmental agencies as well as the public. Funds for the cartographers and other mapping personnel were supplied by the federal Public Employees Program Material; overhead costs were paid by the Division.

Camp Programs

A continued decline in availability of minimum security adult male felons from the Department of Corrections produced changes in the Conservation Camp Program. During 1971 the number of C.D.C. adult camps was reduced from 33 to 24 and early in 1972, three more camps were closed. To offset this loss, Crystal Creek became a County of Shasta camp using Shasta County prisoners and prisoners from adjacent counties. Morena became the second San Diego County Camp. The Department of the Youth Authority took over Oak Glen Camp in Riverside County.

Chamberlain Creek was closed as a C.D.C. camp in 1972. Subsequent to its closing, however, the Division worked out an agreement with the Federal Bureau of Prisons to use Mexican National Federal Prisoners in Parlin Fork. By the end of 1972, the Division had made plans to reopen Chamberlain Creek in early 1973 using the Mexican National Federal Prisoners.

Alder Conservation Camp was staffed with ecology corps men in October of 1972. The Los Osos Ecology Center, adjacent to the Cuesta Conservation Camp, was also opened during the year. It is administered by the Ranger II of Cuesta Conservation Camp.

The new 40-man, Norco Conservation Camp was opened in November at the California Rehabilitation Center in Riverside. The inmates are narcotic addicts under rehabilitation.

Because of these changes, the division ended 1972 with a total of six ecology centers, three county camps, five youth camps, one federal camp, and nineteen adult camps. In the 34 camps, about 1,975 persons made up the large hand crews, vital to the success of any wildland fire fighting agency.

During 1972, the Division began a program to develop ways of improving the productivity of hand crews through both mechanization and new ways

of organizing the men. Part of the study involved the use of chainsaws. Several types of saws were studied for weight and noise fatigue, safety, increased production, maintenance and other factors.

At the end of the year, recommendations were made to purchase four chain saws for each conservation camp in the 73-74 fiscal year. Each camp would have two chain saw crews if this purchase is approved.

Another experimental project was undertaken to study the use of hydraulically operated saws, prune hooks, shears etc. Several brands of tools were tried, as well as methods of moving and using the equipment. The experiment showed the value of hydraulically operated tools, but more

study is needed in this area. Plans were made to continue the study in 1973, using personnel from the automotive engineering group in the fire control section.

WORK PRODUCTION—1972

Conservation Camps	Man- Hours * Worked	Sub Total	Man- Hours Fire Suppression	Sub Total
Alder	10,472		1,044	
Antelope	14,138		674	
Baseline	17,267		1,617	
Black Mountain	17,383		1,789	
Chamberlain Creek ¹	13,998		2,025	
Cuesta	13,547		375	
Deadwood	16,106		497	
Eel River	14,856		1,286	
Growlersburg	17,634		605	
Intermountain	17,736		1,592	
Iron Mine	17,380		433	
Konocti	20,838		1,779	
Magalia	16,653		1,375	
Miramonte	20,140		2,067	
Mt. Home	20,303		790	
NORCO	1,243		—	
Parlin Fork	8,049		989	
Pilot Rock	20,303		1,075	
Prado	18,623		1,601	
Puerta La Cruz	17,031		796	
Rainbow	19,616		1,137	
Slack Canyon	16,685		1,235	
		350,001		24,781
Youth Conservation Camps				
Ben Lomond	17,414		668	
Mt. Bullion	20,571		2,488	
Oak Glen	19,973		1,917	
Pine Grove	16,929		2,342	
Washington Ridge	19,983		1,160	
		94,870		8,575
County Camps				
Crystal Creek	13,268		446	
La Cima	23,610		2,545	
Morena	13,618		920	
		50,496		3,911
Ecology Centers				
Calaveras	19,931		1,820	
Del Norte	1,185		87	
Humboldt	16,475		2,750	
Inyo	13,084		1,521	
Los Osos	2,619		14	
Tehama	11,879		—	
		65,173		6,192
Federal				
Chamberlain Creek	—		—	
Parlin Fork	3,541		56	
		3,541		56
		564,081		43,515

¹—Camp closed November 28, 1972. To be reopened February 1973

* All types of work

CAMP ACTIVITY—1972

	Man- Days *	Sub Total	Percent of Total
Emergency:			
Wildfire			
Division of Forestry	40,774		
U.S. Forest Service	1,751		
County	811		
Other	2,223		
Search and Rescue	564		
All others	3,407		
		49,530	8.80
Presuppression and Facilities:			
Maintenance of Remote Facilities	10,756		
Maintenance of Forest Fire Stations	15,013		
Maintenance and Con- struction of Truck Trails	19,833		
Maintenance and Con- struction of Telephone Lines	2,061		
Miscellaneous Projects	1,027		
		48,690	8.62
Fire Defense Improvements:			
Fuelbreaks	87,647		
Hazard Reduction	20,428		
		108,075	19.17
Forest, Range and Watershed Management:			
State Forest	13,120		
Nursery	8,150		
Seed Collection & Process- ing	402		
Forest Revegetation	498		
Forest Insects	5,436		
Range	100		
		27,706	4.90
Forestry Incamp Projects	41,537		
Fire Academy & Training Facilities	2,471		
		44,008	7.80
Camp Services:			
Division of Forestry	48,371		
Department of Corrections	73,135		
Youth Authority	12,397		
County	2,682		
Training	11,252		
Administration Lay-Ins	11,522		
Building and Equipment Maintenance	43,518		
Miscellaneous Projects	3,411		
		206,288	36.60
Other Services:			
Fish and Game	16,385		
Parks and Recreation	32,898		
Dept. Water Resources	2,504		
Blood Donation	460		
Miscellaneous Agencies	3,514		
Miscellaneous Projects	3,999		
Other Federal Agencies	4,217		
Bureau of Land Manage- ment	871		
U.S. National Park Service	667		
University of California	1,240		
County Agencies	9,599		
U.S. Forest Service	3,430		
		79,784	14.11
TOTAL		564,081	100.00

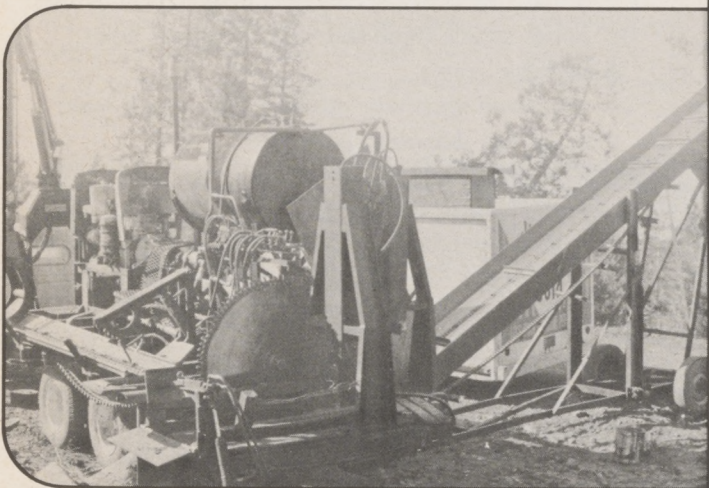
* Includes time of Ecology Corps



Adult inmates from the Department of Corrections formed this conservation camp crew engaged in building a 10,000 gallon reserve water tank to aid in wildland fire fighting. The fuel break visible in the background was also built by inmate crews.



The ecology crew from Los Osos Ecology Center assisted Big Sur State Park personnel in clearing away debris and in rebuilding a sandbag wall after the second and most disastrous mud flow on November 16, 1972.



This oak wood bucking and splitter is contract equipment on the Kimberly-Clark property in Shasta County.



Railing down chemically treated (dead) oak with the "Ball and Chain" provided heavy fuels for an excellent burning job on the Nielsen Ranch, Tehama County.

Fire Control

The primary objective of the fire control element is to provide basic wildland fire protection to all areas classed by the Board of Forestry as state responsibility areas.

Basic fire protection is the degree of preparation and effort necessary: 1) to prevent wildland damage from exceeding an acceptable loss of forest resources; 2) to insure continuous growth and harvesting of timber products; 3) to preserve and maintain watershed production; 4) to protect vegetative conditions that provide food and shelter for wildlife, as well as recreation and environmental quality for people; and to minimize wildfire threat to life, property and adjacent protection jurisdictions.

Fire Weather of the 1972 Fire Season

Each fire season is different but most follow a pattern of severity build-up through the hot summer months, often culminating in some damaging weather events in the fall. For the most part, the fire season of 1972 did not conform to this pattern.

Pre-season events were highly unfavorable. As 1972 began, precipitation in most locations within the state was below normal. The first three months of the year were abnormally dry and warm, and in March there was no measurable precipitation south of a line running through Bishop and Fresno. In Sacramento, this three-month period was the driest on record.

April brought normal temperatures and some precipitation, but the dry trend set by the previous months could not be reversed. Early in April, the first declaration of fire season was made in certain areas. The drought continued through May, and by the first of June "extreme" drought conditions, as defined by the National Oceanic and Atmospheric Administration, existed throughout most of the state south of Sacramento. The first statewide sampling of fire weather severity, early in June, showed this index to be almost twice normal.

June was warm and generally dry throughout the state, although some areas of southern California received rain late in the month. July, also, was generally warm, averaging well above normal, with a severe hot spell around the middle of the month. By the end of July the seasonal fire weather severity was still well above normal.

In August, a series of moisture intrusions brought sporadic rain to southern California and the eastern slopes of the Sierra, lowering the level of severity. The largest of these intrusions was associated with a tropical storm that approached as close as the Channel Islands. September began with hot and dry conditions in the north and cool and moist conditions in the south. Around the 5th, a second tropical storm brought cloudiness and some rainfall to the southern half of the state. In the southern Sierra, amounts were heavy locally. By the end of the month, however, the situation reversed itself. Southern California became warm and dry, while northern California received major

rainfall from a large upper air disturbance. The fire weather severity for September was well below normal.

The large upper air disturbance remained into October, and continued to bring rainfall to northern and central California with large amounts around the 10th. By the 12th the first terminations of fire season were declared. In southern California another tropical storm brought moisture early in the month, and was followed by a moisture intrusion. As a result, although off-shore Santa Ana winds did occur periodically as the fall progressed, the winds did not raise the fire danger to the extreme levels that usually accompany them.

In summary, 1972 was a year when everything was displaced by about one month. The extreme conditions of the early season were balanced by the relaxed conditions of the early fall months. As a result, the statewide seasonal fire weather severity was near the average in a ten-year period, 1962-1971. Of the ten years, this year occupies sixth place in order of severity.

Fire Control Organization

During 1972, the Division's fire control organization included:

- 232 initial attack fire crews operating 370 firetrucks
- 58 initial attack bulldozer and transport units
- 6 helitack crews
- 21 airtankers operating out of 13 air attack bases
- 2 aerial fire detection patrols
- 82 fire lookouts
- 35 conservation camps, including: county, state and federal adult inmate camps, youth ward camps, and free personnel ecology centers
- 23 Ranger Unit headquarters providing administration, logistics, and dispatch command and control to the fire control organization

During the year the fire control organization suppressed 6,032 state responsibility wildfires compared to the 5-year average of 5,514. Those wildfires burned 63,910 acres; the 5-year average is 123,604 acres.

Four helitack units were added to the fire control organization during the year, bringing the total number to six. The new units were added at:

- Fernwood (Humboldt-Del Norte Ranger Unit)
- Laytonville (Mendocino Ranger Unit)
- Bieber (Lassen-Modoc Ranger Unit)
- Smith Creek (Santa Clara Ranger Unit)

Because of the substitution of helitack crews for ground attack crews and consequent changes in the budget and in protection area initial attack coverage, a number of changes were also made concerning fire stations. The following stations were closed:

- Rockport 1-truck crew, Mendocino
- Fernwood 1-truck crew, Humboldt
- Brownsville 1-truck crew, Nevada-Yuba-Placer

Shady Creek 1-truck crew, Nevada-Yuba-Placer
 Madera 1-truck crew, Madera-Mariposa
 Sanger 1-truck crew, Fresno
 Mustang 1-truck crew, San Benito-Monterey
 Miramar 1-truck crew, San Diego

The following stations were reduced from two-truck to one-truck size:

Alderpoint, Humboldt
 Thorn, Humboldt
 Porterville, Tulare
 Castle Rock, Santa Clara
 Big Creek, San Mateo-Santa Cruz

The following stations were added:

Springville 1-truck crew, Tulare (relocation from Visalia)
 Mattole 1-truck crew, Humboldt

The following stations were increased from one-truck to two-truck size:

Columbia Hill (from Shady Creek), Nevada-Yuba-Placer
 Coarsegold (from Madera), Madera-Mariposa
 Piedra (from Sanger), Fresno-Kings
 Robinson Mills (from Brownsville), Butte

Several changes were made in the boundary separating the area protected by the Division of Forestry from the area protected by the United States Forest Service. These changes resulted in a total of 485,000 acres being transferred from Forest Service protection to CDF protection. The specific changes were as follows:

Pondosa-Wiley Ranch Area—Lassen National Forest and the Shasta-Trinity and Lassen-Modoc Ranger Units.

Area changed to CDF protection: 249,000 acres
 Added CDF protection forces:

Pondosa 2-truck station, Shasta-Trinity Ranger Unit
 Bear Mountain Lookout, Shasta-Trinity Ranger Unit
 Soldier Mountain (formerly BLM contract with USFS), Shasta-Trinity Ranger Unit
 Bieber Helitack Unit (in part), Lassen-Modoc Ranger Unit

Hayden Hill-Pat Morris Area—Lassen and Modoc National Forests and Lassen-Modoc Ranger Unit.

Area changed to CDF protection: 239,000 acres.
 Added CDF protection forces:

Increase Grasshopper from 1-truck to 2-truck station, Lassen-Modoc Ranger Unit
 Manzanita Lookout, Lassen-Modoc Ranger Unit
 Hayden Hill Lookout, Lassen-Modoc Ranger Unit
 Bieber Helitack Crew (in part), Lassen-Modoc Ranger Unit

Lava Rim Area—Modoc National Forest and Lassen-Modoc Ranger Unit.

This change modified the boundary change made in the White Horse area in 1971.

Area changed to USFS protection: 3,000 acres.
 No change in protection forces.



A fire demands close coordination between the large hand crews of the conservation camps, the helicopter, and the initial attack crew on the firetruck. This is the Pocket Gulch Fire on July 14, 1972, near Laytonville.



A three year study of the Division's dispatch and communications system has led to improvements in radio equipment, dispatch procedures, and resource status displays.

Dispatching and Communications

A tri-level statewide system of dispatching is maintained to enable the suppression organization to function as a flexible mobile attack force. The 23 Ranger Unit Headquarters are the first level of local dispatch. Five District Office dispatch centers provide regional coordination and the State Forester's Office provides statewide coordination.

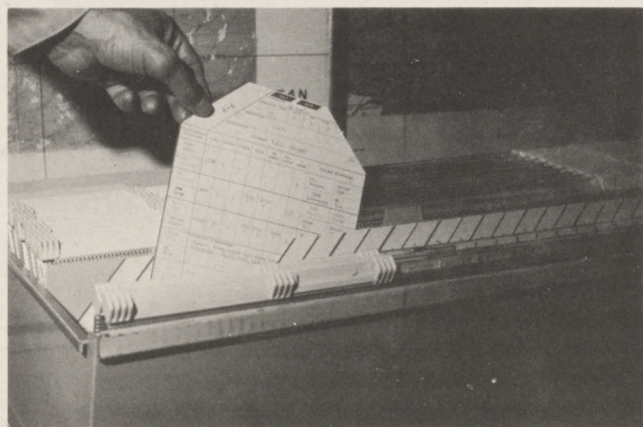
During 1969 and 1970, System Development Corporation (SDC) of Santa Monica studied the feasibility of improving the Division's dispatch system. Improvements begun in 1971, as a result of SDC's study, were near to completion by the end of 1972.

These improvements, mostly in Ranger Units, included: running cards for systematic response to emergencies, improved forms for record and status keeping, facsimile transmission between offices, improved personnel and equipment status display boards, operations map display, and supplementary map storage. Improvements begun, but not completed in 1972

included, voice recorders and an experimental status and record-keeping device called the "pigeonhole system." A pilot dispatcher training course was conducted at the Fire Academy. On December 31, 1972, SDC completed their second contract with the Division. A final report on this effort will be presented to the Division in early January, 1973.

During 1972, new radio equipment was purchased and installed to replace existing equipment and to implement certain planned portions of the radio system, as follows:

1. 118 new mobile radios were installed. These were replacement units capable of operating on the state net, one district net, and one local radio net. With these radios the Division was able to implement the new three net radio system in four more Ranger Units. At present, 22 of the 23 Ranger Units have their own local net radio systems.
2. 15 new mobile relays were installed. These were all replacements of existing mobile relays throughout the state.



The Division's improvement in dispatch procedures includes the use of "running cards", designed to provide systematic response to emergencies.

3. Three more solar generator systems were installed to power radio equipment at remote mobile relay sites. Thus far, the Division has six solar generators in operation.
4. 224 additional personal portable radios (handie-talkie sets) were purchased and placed in operation. These were a mixture of two-frequency, three-frequency and five-frequency units. The five-frequency sets were assigned to helitack crews, the three-frequency sets were assigned to administrative personnel in the field Ranger Units, and the two-frequency sets were assigned for use by other personnel in the Division. This purchase fulfills about 80-85 percent of the Division's projected addition of this type of radio.
5. Five new dispatch and communication center consoles were purchased and installed. These are two-position consoles utilized by the Ranger Unit dispatch personnel.
6. An additional radio mobile relay was established at South Mountain Lookout in Ventura County to operate on the state net radio system. Its primary purpose is to give radio communications to CDF personnel assigned to assist with fire control operations in Ventura County, a "contract" county.
7. It was necessary to revise the radio system in the Lassen-Modoc Ranger Unit to accommodate the increased fire protection responsibilities caused by the U.S. Forest Service-CDF protection boundary change in this area. This involved the installation of a new radio relay at Widow Mountain and the installation of a remote radio control station.
8. The Division purchased nine radio pocket pagers for evaluation, and placed them in service. This radio instrument may be of some value to CDF's administrative personnel in the field.
9. 81 multi-channel monitor receivers of the scanner-type were purchased and distributed to the field. These will be used at Ranger Unit Headquarters, air attack bases, and in vehicles to increase CDF's ability to cross-communicate with other fire agencies.

Air Attack Operations

After several months of negotiation new contracts for airtanker services were awarded in late June by a joint U.S. Forest Service-California Division of Forestry Contracts Awards Board. The combined CDF-USFS fleet of 34 airtankers were used on early season fires while negotiations were underway.

The Division's helitack crews were increased from two to six through a reallocation of budgeted funds. These crews, all located in the northern half of the state, were provided with Bell Jet Ranger 11, 5-place, turbine-powered helicopters through bid contracts. Pre-season and continued on-the-job training of helitack techniques proved the value of specialized training as the fire season progressed.

Air attack activity was heavy from mid-June through early August. With a gradual easing of burning conditions, use tapered off and all contracts terminated on schedule. As conditions eased in the northern part of the state, two of the helitack crews were relocated to southern California to finish out the season.

A wheels-up landing of an airtanker and an unusual helicopter accident marred an otherwise regular season.

In 1971 the Division acquired four Grumman S-2 aircraft from the Navy on a five-year lease. The conversion of this aircraft to an 800 gallon airtanker began with Phase I of a cooperative CDF-USFS program. Phase I consisted of the release of one aircraft by the Navy to the Forest Service for qualitative test of performance and handling qualities. The tests were completed by U. S. Army Aviation Test Activity (A.A.S.T.A.) at Edwards Air Force Base under the direction of both the Forest Service's San Dimas Equipment Development and Test Center and the Division of Forestry. Phase II, involving aircraft modification, tank design and field testing, was begun using additional aircraft leased by the Navy to the Division. As the field testing is concluded, each aircraft will be returned to A.A.S.T.A. for final testing in the airtanker configuration (Phase III), and will receive type certification from the F.A.A.

The Ontario, Canada, Department of Lands and Forests completed the conversion of an S-2 in December 1971 and placed it in service at the start of the 1972 fire season at Sudberry, Ontario. Their cooperation with the Division of Forestry has eased a difficult task and the Division is grateful for their assistance.

At the request of the State Legislature, an in-depth evaluation was made of the expanded helitack program during the 1972 fire season. A data reporting system was devised to collect helitack unit activity information, field fire managers were asked to evaluate effectiveness of the units, narratives were written describing each helitack operation, and field activities of the helitack crews were observed and photographed.

A total of 878.4 rotor hours was accumulated by the six helitack units during the contract period. Fire dispatchers of all kinds used about 84 percent of the hours, training accounted for about 7 percent, and the remaining 9 percent was charged to other miscellaneous activities. The crews responded to 339 fires, including several false alarms and some other fires that did not require their use. The helitack crews made first attack ahead of ground crews on 148 of the 241 fires in which they were actually used. They were responsible for controlling 63 fires before the first ground crew arrived. Fire managers said the crews were of more than minor help, with control actions in 85 percent of the cases they evaluated. They also reported that crews fully controlled the fire or significantly slowed its spread in 35 percent of the cases. The report to the Legislature concluded that helitack is a worthwhile and productive part of the Division's fire protection system and encouraged continuation and refinement of the program.



Safety is basic to all helitack operations. During this manpower shuttle on the Molera fire near Big Sur, the helitack crewman physically controls passengers unloading from the helicopter.



He maintains this control as they move away from the aircraft. Note that helicopter's whirling tail rotor is almost invisible.



The S-2 submarine tracker is a possible replacement for medium air-tankers now in use. This aircraft, one of four S-2s on loan to the Division of Forestry from the U.S. Navy, is being converted to carry 800 gallons of fire retardant. It should be operational during the 1973 fire season.

Cooperative Fire Protection

In a state as complex as California, close cooperation between all fire protection agencies is essential. In no other part of the world do weather, topography, fuel, and people combine to cause so many fire disasters.

Although there are mutual aid agreements between the fire services, much closer liaison is needed. Cooperation and coordination of fire control activities, where responsibilities sometimes overlap, demand effective day-to-day working relationships between agencies.

The Division of Forestry maintains close contact with the Office of Emergency Services for disaster emergency work. In addition to fire control responsibilities, the Division stands ready with manpower and equipment to assist other agencies in the event of non-fire disasters. Division personnel also serve as radiological monitors throughout the state.

During 1972, the State Forester provided fire protection to local governments through 32 contracts in 25 counties. The program, under Section 4142 of the Public Resources Code, provides varying degrees of fire protection to local governments. The amount and intensity of service given is determined by the county board of supervisors or other governing authority. This service varies from partial protection, involving one piece of fire apparatus, to a fire defense program, protecting entire unincorporated areas of a county. The cost of the service is fully reimbursed to the state. During 1972, the Division developed minimum standards for personnel, equipment, facilities, and response to be used in contracting services to local government.

During the 1972-73 Fiscal Year, the Division's contracts for protection service to local governments amounted to \$12,932,738 for reimbursed expenditures and \$5,068,386 for direct county expenditures, a total of \$18,001,124 and an increase of 18 percent over the previous year.

The Division of Forestry again contracted to protect 4.25 million acres of "state responsibility lands" in the "contract counties" of Kern, Santa Barbara, Ventura, Marin and Los Angeles. The Division budgeted \$3.28 million to these counties during the 1972-73 Fiscal Year for a "basic protection" level, covering manpower and station operational costs. The Division often takes an active role in suppression assistance to these counties and, in addition to the annual contracted funds, assists with manpower and equipment, when requested, on major and campaign fires.

Cooperative agreements with federal agencies are an important part of the Division's protection program. The United States Forest Service protects approximately 4.5 million acres of state and private land under a long-standing agreement with the Division, and adjustments in USFS-CDF protection boundaries are made regularly for the most efficient use of suppression forces in both agencies. 1972 boundary changes are described in the preceding section on Fire Control Organization. The Division continued to work closely

with the USFS in many matters of common interest, such as fire planning, air attack operations, fire danger rating, fire prevention, and research and development. Fire protection agreements were renewed with the Bureau of Land Management and the National Park Service. The Division of Forestry and the Bureau of Land Management protect off-setting areas of each other's lands in Lassen and Modoc Counties. The Bureau also pays the Division to provide protection to nearly 2.3 million acres of public land throughout the state.

Water Project Fire Protection Planning

Planning continued on two Type IV River Basin studies*, the North Coast Study and the Central Lahontan Study. These studies are in cooperation with both federal and state agencies.

Installation of land treatment measures (fire protection) on the Escondido Creek Project in San Diego County were continued under Public Law 566.

The Division of Forestry, together with the project sponsors and the U.S. Forest Service, have agreed upon a plan of work and are proceeding with the installation of land treatment measures (fire protection) on the Upper Llagas Creek Project in Santa Clara County. Rights-of-way have been obtained and funds from the sponsors and the Forest Service have been committed.

Fire protection measures included in the Main Street Canyon (Riverside County) and Carpinteria (Santa Barbara County) Public Law 566 projects will be installed by the United States Forest Service on both federal and privately owned land. The Division participated with the Forest Service and project sponsors in the determination of fire protection needs.

Wildland Fire Protection Study

Progress continued on the Division's two-year, "Study of the Life and Property Protection Problems on the State and Privately Owned Wildlands of California" begun on July 1, 1971. The first year cost was \$61,540, and second year costs are estimated to be \$67,500. Two-thirds of the cost is funded by the Federal Department of Housing and Urban Development under Section 701 of the Housing Act of 1968. The other one-third is labor and services contributed by the Division of Forestry and other personnel in the Department of Conservation.

The study includes three specific areas relating to life and property protection problems in the state's wildlands.

1. Fire Hazard Areas.

One objective of the study is to develop criteria for identifying varying degrees of hazard or threat of encroaching wildland fires to structural exposures. These criteria will be included in the

* Type IV River Basin studies are comprehensive plans to protect the nation's land and water resources. They were established under Section 6 of Public Law 566, for purposes of (1) flood prevention, or (2) conservation development, utilization, and disposal of water. The federal government cooperates with states and their political subdivisions, soil and water conservation districts, flood prevention and control districts, and other local public agencies in carrying out this program.

state's land use policy, being developed by the governor's Office of Planning and Research, and should be useful to local governments for land use planning and zoning.

2. Fire Safe! and Hazard Reduction Laws.

In 1965 the County Supervisors Association of California adopted the Fire Safe! Program as developed by the wildland protection agencies. This program provides information and fire safety recommendations for land use planning, zoning, and ordinance requirements. The program is being studied to determine to what extent it has been adopted by local governments and the degree of effectiveness where adopted. In 1963 the State Legislature enacted several laws to aid in the prevention and suppression of wildland fires. Included were the hazard reduction requirements for clearing around structures (Section 4291, P.R.C.), powerline hazard reduction (Sections 4292-4296, P.R.C.) and the regulation of rubbish dumps (Sections 4371-4375, P.R.C.). Since these statutes are closely related to the fire safety recommendations contained in the Fire Safe! Program, a survey was conducted to determine their effectiveness and value for fire prevention purposes.

Results of these evaluations are expected to suggest improvements to the Fire Safe! Program and the hazard reduction laws. Such improvements should be beneficial for planning and administrative purposes to all levels of government, and should provide more protection from wildfire to persons living in wildland areas of the state.

3. Fire Protection Jurisdictions.

The third phase of this study is designed primarily to develop alternative ways of providing fire protection jurisdiction. To date, 360 separate taxing entities and 140 non-tax supported volunteer fire companies have been identified as providing fire protection for more than six million of the 37 million acres of state responsibility area. This protection system is being evaluated, with emphasis on the protection of life and property, to determine possible alternatives that might provide efficiency and economy at both state and local levels.

To conduct an in-depth analysis of the present fire protection systems in the state, five counties were selected to serve as models. These counties are El Dorado, San Bernardino, Santa Cruz, Shasta and Sonoma. Within these counties are 83 of the 360 taxing entities and 33 of the 140 volunteer fire companies providing structural fire protection in the state responsibility area. Several alternative models for fire protection service will be tested in each of the five counties under study.

To coordinate these study areas with other ongoing fire protection and land use programs, the Division maintains contact with the Council on Intergovernmental Relations in the Governor's Office, the U.S. Forest Service, the Bureau of Land Management, several action committees of the Task Force on California's Wildland Fire Problem, and the California Fire Chief's Association.

The study is scheduled for completion by June 30, 1973.

Fire Research

Research and development have a significant role in the Division of Forestry's programs. Research provides fundamental knowledge necessary for understanding complex problems in forest protection, fire prevention, and wildland resource management. Development of equipment and techniques provides the tools to attack these problems.

Cooperative agreements or contracts between the Division and agencies or institutions engaged primarily in research are the principal means of meeting Division research needs. The Division continued its cooperative research program with several other governmental agencies and private companies in 1972. Money was allocated to the Pacific Southwest Forest and Range Experiment Station of the U.S. Forest Service for research in fire management systems and fire meteorology.

The Division also renewed its agreement to work with the Experiment Station in a cooperative program of fuelbreak research.

Division personnel conducted several research and development projects, and evaluated new equipment designed to assist fire control operations.

Here are descriptive summaries of several projects:

1. In cooperation with other agencies, a field test of "Rapid Water" was held in southern California in late January. This long-chain polymer, when added to water in very small amounts, quiets turbulence in fire hoses, thus reducing friction loss and increasing flow volume with no change of pressure at the pump.
2. Infrared filters were used with a portable black-and-white television camera system to enhance contrast between burned and unburned areas on fires. Results were encouraging and, unexpectedly, some ability to see through smoke and haze was developed.
3. A tomahawk cutter-brusher-compactor, mountable on the blade of a D-6C bulldozer, was obtained and tested for its ability to crush brush during construction and maintenance of fuelbreaks as an alternative to hand labor. Results are not yet complete.
4. An ongoing program objective of the Division is to insure that its automotive equipment is con-

tinually updated and that every advantage is taken of modern automotive technology and engineering. Toward this goal the "pilot" unit of the Number 10 Model firetruck was constructed. This model is a heavy four-wheel-drive firetruck

with automatic transmission, hydraulic winch, a six-man cab, 300 gpm pump, and 500 gallons of water. An updated and improved version of the Division's bulldozer service vehicle was also engineered, designed, and constructed.



This pilot model no. 10 firetruck was developed by the Division in 1972 to fulfill the need for a heavy, four-wheel-drive vehicle. It was designed to carry six people, 500 gallons of water, and a 300 gpm pump. It will be used as a model by private contractors to manufacture additional firetrucks for the Division's fleet.

Fire Prevention



The long-term objective of the fire prevention element is to hold the occurrence of all man-caused fires on state responsibility lands directly protected by the division at the 1966-70 annual average—5,514 fires—by means proved effective in preventing the ignition and spread of uncontrolled man-caused fires.

More specifically, the objective is to influence people—those who live, work, or play in the wildlands—to act in a fire-safe manner and to reduce or eliminate physical hazards or risks. There is no intent to prohibit the use of fire or fire risk agents or equipment. The intent is to regulate the use of fire or potential ignition sources in such a way that “uncontrolled fires,” as defined in Section 4104, Public Resources Code, do not occur in excess of the above stated objective.

The goal for the 1973 fire season will be to hold the occurrence of all man-caused wildfires on state responsibility lands directly protected by the division to less than 6,400 fires (based on prediction from calculated trend).

Fire Prevention Engineering

There were 17.6 percent fewer railroad fires last year than the year before, proving the effectiveness of efforts by the railroad to reduce fuel hazards along their

rights-of-way in the wildlands and to modify their power equipment for exhaust spark free operation. They have also begun replacing all brake shoes with a non-sparking type. Railroad fires are 33 percent below the prevention objective of the 1965-69 annual average. Maintaining the present downward trend will not be easy and will require that the Division train employees to recognize railroad problems, to enforce prevention programs, and to carefully inspect equipment, facilities, and rights-of-way. All railroads operating in California have indicated that they now comply with the spark arrester requirements for locomotives. The Southern Pacific Transportation Company has increased its vegetation control program 33 percent and has treated certain sections of its track with fire retardant.

The number of powerline fires dropped 18 percent from 1971 figures, but the overall upward trend continued. Regulations have been drafted that would permit the use of certain high density and high molecular coverings on distribution lines of 12,000 volts or less in lieu of conductor clearance. Conductor clearance from trees or limbs that may touch or fall through the lines is a major problem. There were 1,081 violations of the powerline clearance requirements observed in 643 inspections, and 2,884 power pole clearance violations observed in 881 pole inspections. The lack of

adequate inspection and correction by both the utilities and the Division contributes to the high number of this type fire. Powerline fires are 25 percent over the 1965-69 goal.

The number of fires started along roadsides continued to increase in 1972, and is now 66 percent above the 1965-69 goal. The fire prevention staff is working with the State Division of Highways to develop a mower-blower arrangement that will cut vegetation about two inches above ground level, draw up the fine fuel, and either deposit it beyond the hazardous ignition zone or transmit it to the dump portion of the unit for later disposal. Research to determine the cause of roadside fires and to define a hazard ignition zone was continued.

Information and Education

The California Fire Prevention Committee held annual meetings in San Francisco and Hollywood during May 1972. Chairman Lewis A. Moran, State Forester of California, stressed the importance of citizen involvement in preventing forest, watershed, and range fires. "Due to lack of rainfall, California wildlands are tin-



Reforestation Advisory Committee members discuss reforestation problems with U.S. Forest Service personnel on the 1970 Laguna Mountain Burn in San Diego County.

der dry and ready to explode into massive conflagrations should the right weather conditions occur and man continue his careless ways with fire," Moran said. "We need only the spark."

The highlight of both meetings was the annual presentation of the coveted Smokey Bear Plaque Award. Best Foods Division of CPC International won the award for Northern California. Best Foods installed Smokey Bear displays at supermarkets throughout the state. They displayed picnic products alongside the slogan "public enjoyment in the outdoors, but be careful with the use of fire." In Southern California, KNBC Channel 4 television, received a special award for year-round support of forest, watershed, and rangeland fire prevention. Backed by strong management and executive office policy, their public service and news programming in support of fire prevention, deserved special recognition.

The San Francisco meeting was hosted by the Pacific Telephone Company. Charley Coleman, Account Ex-

ecutive of the Smokey Bear program, showed films and slides of the 1972 campaign. Dr. Frank Gladen spoke on research and programs developed to study children-caused wildfires (children-caused fires account for approximately 25% of the wildland fire incidents in California).



Howard Sturm (center) Public Service Manager KNBC-TV channel 4, accepts CFPC Smokey Plaque Award from Smokey Bear and committee chairman, Lewis A. Moran.



Henry L. Loretz (right), Conservation and Fire Prevention Chairman of Associated Sportsmen of California, receives a special award from Lewis Moran in San Francisco.

Henry Loretz, Conservation and Fire Prevention Chairman of Associated Sportsmen of California, was honored for his efforts in conservation education. His association purchased and distributed "Teachers Packets" to schools in California.

Fire Chief Richard Houts of the Los Angeles County Fire Department hosted the Hollywood meeting. Several CFPC members presented fire prevention programs: Arthur DuFault, Public Information Officer, Angeles National Forest, presented the 1972 Smokey Bear Program; Dave Klein, Safety Officer, District 13 National Power Squadron, discussed boating and recreation fire prevention, and Jeanne Daughton, Safety Publications Specialist, Southern California Automobile Club of America, outlined her club's expanded motorist fire prevention programming. A no-host luncheon was highlighted by guest speaker William H. Fairbank, Jr., of the Metropolitan Water District. Fairbank created CFPC in 1947.



Loren (Bud) Good (center) accepts the Cooperative Forest Fire Prevention Smokey Bear Plaque at the CFPC meeting in San Francisco. Presenting the award are Richard Millar (right), Assistant Regional Forester, and State Forester Lewis Moran.

Loren (Bud) Good, executive vice president of the Redwood Region Conservation Council, was awarded the Cooperative Forest Fire Prevention Smokey Bear plaque for his many years of work in the conservation field. Good worked closely with the Division of Forestry in developing and selling the idea of the "Teachers Packet" to educators throughout the redwood region. Through his efforts, 100 packets were purchased by the council and distributed to elementary schools. He has encouraged fire prevention through news media contacts and through the council's annual sponsorship of the Junior Logging Conference Program.



Joe DeLucchi (right) receives the Smokey Bear Plaque for his efforts in fire prevention from State Forester Lewis Moran.

Joe DeLucchi, rancher and owner of DeLucchi Farms, was awarded the CFFP Smokey Bear plaque at the Board of Forestry meeting in Santa Barbara. Each year, DeLucchi has distributed an average of one million pieces of CFFP and CDF fire prevention materials to schools, youth groups, sport clubs, and private citizens. During major league baseball seasons, he has promoted Smokey Bear programs in each major league stadium in California, presenting "Fireman-of-the-Year" awards to the best relief pitchers. DeLucchi has extended his fire prevention programs to over 200,000 fans at the Ontario 500 and Riverside Motor Raceways.

KCRA-TV, Channel 7 in Redding was awarded the CFFP Smokey Bear Plaque for promoting fire prevention in Northern California and Southern Oregon. During the declared fire season, 7-R News provided many news spot shots, to keep their viewing audience aware of the need for fire prevention and the efforts expended by the U.S. Forest Service and the Division of Forestry to minimize the fire hazards. The "fire condition" board, part of a four-times-daily weather forecast, give viewers an up-to-the-minute account of the current fire danger and fire activity.

The "Pre-school and Early Elementary Fire Prevention and Conservation Education Teachers Kit" has received widespread acceptance in the educational system in California. Four thousand kits had been produced as of the end of 1972. In addition to California sales, 105 kits were sold to the Lions Club of Canberra for presentation to schools in Australia. One kit was sold to the State Library in Hobart, Tasmania. A total of 174 teachers kits were sold outside of the state to schools, libraries, and public conservation agencies. Refill kits were made available late in 1971 to replenish consumable items.

A new educational conservation and fire prevention film series is under production with the first film completed. The series stems from fire prevention research conducted by the Pacific Southwest Forest and Range Experiment Station and Dr. Frank Gladen of Chico State University. It will feature ten 10-minute films on various environmental conservation themes. The films artfully blend puppets, live children, a forest ranger, and outdoor photography into an effective educational tool.

The series, produced in conjunction with the Department of Water Resources, is written, directed, and photographed by Larry Filby, Department of Water Resources cinematographer. Fire Prevention Officer Art Jaseau of Monterey is the technical director. Richard Blay, a prominent northern California puppeteer, designed the set and the four puppet characters used throughout the series.

When complete, this series will complement other fire prevention programs designed to reduce the caused fire problem. It will focus primarily on elementary grades, kindergarten through third. The first film in the series was classroom tested at these grade levels to determine absorption, retention of material, and general enthusiasm and acceptance. In all respects, the film was found exceptional.

More than 280 film titles are maintained in the Division's film library. Many new films are previewed each year to keep the library current and viable. During 1972, new films were purchased at a cost of \$6100. This library is used for public presentations and training purposes. During 1972, employees showed these films to more than 150,000 people statewide.

The film, "Countdown to Calamity," produced for the Division by Water Resources, received the Award of Merit in annual judging by the National Committee on Films for Safety. This is the third major award achieved by this film.

Fire Prevention Training

In 1972 the Division added a one-week preliminary fire investigation course to its fire prevention training program. This course was designed to train Fire Captains and Fire Apparatus Engineers, both of whom conduct many preliminary fire investigations, in fire cause determination and initial fire investigation. Approximately ninety students completed three pilot classes, one at Coalinga, and two at Oak Glen.

The Division's six-week basic peace officer training course was completed by forty students, including: six patrolmen from the East Bay Municipal Utility District, the fire chief of the East Bay Regional Park District, the Beaumont City Fire Chief, and members of the Orange County Fire Department. Seventy-five students completed four weeks of the six-week course, and fifty-two students completed the first two weeks of the course. The course is certified by the Commission on Peace Officer Standards and Training (P.O.S.T.), and is an accredited course of San Joaquin Delta College. Students earn four semester units of college credit for each two weeks of training and a total of twelve units for course completion.

In addition to the basic course, fifty-three students completed one week of advanced peace officer training, and fifteen students completed a special firearms instructor course. They were appointed as CDF Rangemasters.

Twenty-six students completed a one-week Basic Fire Prevention Education course. Approximately 2,590 man days of fire prevention training were completed during the year.

Fire Prevention Research

Fire prevention research is supported cooperatively by the California Division of Forestry, the U.S. Forest Service Region 5, and the Pacific Southwest Forest and Range Experiment Station. Last year, the staff of Chico State University assisted with certain phases of the research. Since about 80 percent of the wildland fires in California are started by man, research is needed to increase our understanding of the problem and to develop and test new methods for reducing the frequency.

Equipment-use fires are being studied in the Central Coast District because they are the most common cause of major fires during critical weather periods. Fire investigation reports on equipment-use fires for the last ten years are being analyzed in terms of: types of equipment, specific causes, dates, times, locations, and operator information.

Two versions of a television film, one using Smokey the Bear as the narrator and the other using a youth, were shown in separate cities to compare specific attitude changes. A group of viewers in each of the two test areas and a separate control area were interviewed before and after exposure to the film. Preliminary results showed a change toward a stronger fire prevention attitude where the youth film was shown, in response to one of ten statements: "Fire prevention rules and regulations should be more strictly enforced."



Grade-specific instructional material, designed to supplement the Fire Prevention and Conservation Teachers Packet is being compiled at Chico State University. Four teams, of four teachers each, were selected to develop appropriate material for each grade level, K through 3. The material will be tested in classrooms before it is formally completed. The kits will contain conventional cassette tape programs with student workbooks and test material.

Three roadside fire prevention signs, found to be most effective in earlier studies, were exposed to the same test area near Butte Meadows. Some 617 completed questionnaires reemphasized the effectiveness of the short verbal message on the sign. In another test, various signs were placed along several miles of roadway and motorists were questioned after they had driven through the test area. A very low percentage recalled any of the content of the traditional longer message signs. Signs with a graphic message and few words were recalled most readily. None of the control variables, such as place of residence, frequency of traveling the road, age, sex, or number in car, had any significant effect on motorists' observations.

The carbon particle study conducted at the fire laboratory has refuted the old premise that exhaust carbon particles ignite fuel by contact. This project has shown that the carbon particle is not solid, but porous. It can contain up to five times its weight in raw, unburned fuel. Flammable vapors are given off and accumulate around the particle. When this heat source ignites, temperatures between 1600° and 2000° F are produced.

Workload Inventory and Accomplishments in Fire Prevention: 1972

Item	Number (Miles)	Treated (Miles)
Roadsides	28,451	9,830
Railroads.....	1,456	1,164
Power Lines	23,554	12,536

	Number	Inspections
Dumps	835	1,227
Structures and Premises	383,498	167,057
Recreational Areas	5,391	6,467
Forest, Mills, and Operations	2,431	1,012
Industrial and Agricultural Operations.....	6,509	5,711
Mechanical Equipment	58,969	11,872
Burning Permits Issued (inc. local area)	73,193	11,636
Project Permits Issued	1,073	1,073

	Number	Articles Programs
Press, TV, Radio, Theater	1,905	13,274
Schools	2,831	4,796
Clubs, Groups, Associations	6,492	1,865
Commercial	1,580	20
Exhibits-Outlets (fairs, parades)	402	288
Recreational Areas (organized)	1,300	163

Fire Prevention Materials Distributed	Number
California Division of Forestry.....	1,882,723
Cooperators	1,927,700
Fire Prevention Public Contacts	594,581
TV Spots Distributed	314
Fire Prevention Committee Members.....	565
Enforcement Cases:	
Misdemeanors (Prosecutions completed)	200
Felony (Prosecutions completed)	14
Fire Cause Investigations	7,867
Civil Cost Collection (Cases closed)	242
Research Projects	9
Employees Given Training	345

Wildfire Incidence (CDF Direct Protection)

	1971	1972	5-Year Average
State Responsibility (Zones 1&2) ..	6,086	6,032	5,514
Local Responsibility (Zones 1&2) ..	1,079	1,080	1,245
County Responsibility (Zone 3)	8,683	8,652	9,457
Total Responses (Zones 1,2,&3) ..	15,848	15,764	16,216

Major Causes (Zones 1&2)	1971	1972
Lightning	147	467
Playing with Fire.....	888	805
Incendiary	1,003	925
Equipment Use.....	958	934
Smoking	616	534
Debris Burning.....	647	565
Railroad	214	174
Electric Power	200	169
Campfire.....	259	242
Miscellaneous	865	835
Undetermined	289	382
Total	6,086	6,032

Causal Agents and Location	1971	1972
Occupant	835	756
Recreationist or Traveler	1,019	853
Hunter	89	65
Roadside	1,019	874

Net decrease of 374 man-caused fires in 1972 from 1971 level representing a 6.3% reduction in fire incidence.

CALIFORNIA WILDFIRE SUMMARY—1972 (State and Federal Wildland Protection Areas)

CALIFORNIA DIVISION OF FORESTRY	Wildfires	Acres Burned
Total This Year	6,032	63,910
Total Last Year.....	5,831	44,568
Five Year Average	5,988	123,604
U.S. FOREST SERVICE		
Total This Year	2,976	39,225
Total Last Year.....	1,890	33,145
Five Year Average	2,170	92,188
BUREAU OF LAND MANAGEMENT		
Total This Year	119	5,700
Total Last Year.....	42	277
Five Year Average	165	7,500
NATIONAL PARK SERVICE		
Total This Year	251	2,525
Total Last Year.....	162	723
Five Year Average	187	2,249
CONTRACT COUNTIES *		
Total This Year	1,260	2,718
Total Last Year.....	2,092	9,630
Five Year Average	2,346	76,000

STATE WIDE TOTAL		
Total This Year	10,638	114,078
Total Last Year.....	10,107	88,343
Five Year Average	10,856	301,541

* Kern, Los Angeles, Marin, Santa Barbara, Ventura (Five year average for 1967 through 1971)

Through the ignition study, physical characteristics of 75 different brands of cigarettes have been identified and may be used to support fire cause investigation. Effects of wind speed and direction, relative humidity, and temperature on the burning rates of cigarettes in

a horizontal position have been established. Three sizes of cheat grass fuels, tested at specific wind speed and temperature, have been used to determine the boundary moisture content at which glowing combustion will begin.

Forest, Range, and Watershed Management

Forest Practice

On December 15, 1971, administration and enforcement of the forest practice rules ceased because the courts had found parts of the Forest Practice Act, providing for rule formulation and the role of the forest practice committees, unconstitutional. Until the end of June 1972, Division of Forestry forest practice activities were largely confined to administering timber operator permits.

Four new forest practice bills were introduced in the State Legislature. On June 29, SB 183, after passing the Legislature in greatly amended form, was signed into law by Governor Reagan. This bill, effective immediately because of an urgency clause authorized the Board of Forestry to adopt temporary forest practice rules for a period of no more than 180 days. The Board convened the following day and adopted temporary rules effective from June 30 through December 26. The Division of Forestry immediately resumed rule administration and inspection of timber operations for rule compliance. The temporary rules were substantially the same as those in effect in 1971. The remaining three bills died in the 1972 legislature. On December 13 the Board of Forestry readopted the temporary rules to continue without interruption for an additional 120 days beginning December 27.

Governor Reagan appointed Kermit Cuff, representing private timber ownership, to a vacancy on the Coast Range Pine and Fir Forest Practice Committee. Elmer Zimmerman requested that he be replaced on the North Sierra Pine Committee.

The Board of Forestry kept informed of forest practice legislative proposals through special reports at its meetings, and it urged adoption of emergency legislation. The Board also held a field trip in connection with its meeting in Tehama County, spending part of the time observing logging and forest practices in the Coast Range Pine and Fir District on the west side of the Sacramento Valley.

The North Coast Regional Water Quality Control Board, after public hearings, adopted tough regulations on discharge of wastes and pollutants into streams from logging and associated activities. The regulations will have considerable impact on private logging operations because they prescribe tight standards for silt and soil, slash, woody debris, and other waste materials that are discharged. The North Coast Regional Water Quality Control Board's jurisdictional area includes parts of the Redwood, North Sierra Pine, and Coast Range Pine and Fir Forest Districts.

Napa County adopted an ordinance that is stricter than the State Forest Practice Act in regulating timber cutting. The counties of Napa, San Mateo, Marin and Santa Clara are authorized to adopt such ordinances under the Forest Practice Act.

The Tahoe Regional Planning Agency hired a forester, and held hearings on a strict timber harvesting ordinance.

In 1972 the State Forester issued 192 regular timber operator permits, 127 temporary permits, and 866 renewal permits, collecting \$20,096 in license fees. There were five more operators in 1972 than in 1971. Some 803 operators in 1971 cut 4.8 billion board feet of saw and veneer logs, and 19.3 million board feet of pulp logs. Some 377 others cut Christmas trees and greens, and 10.7 million board feet of other miscellaneous forest products, including split products and firewood.

In 1972 the Division made 1,060 forest practice inspections in the six month period the temporary rules were in effect, finding that 95 percent of all rules inspected for were in compliance. Inspectors observed 342 rule violations. As in previous years, the Division enforced most laws administratively, sending 311 notices of violation of forest practice rules. At the end of 1972 14 forest practice cases were considered for possible permit denial and corrective action.

Six conversion certificates for 7,998 acres were issued. These certificates were all to convert forest land for grazing purposes.

Higher prices and demand for wood products increased pressure on both private and public timberlands late in 1972. This, together with the increased concern for protection of environmental values, has resulted in more public attention being focused on timber harvesting operations.



Fine residual stand after second cut in the Coast Range Pine and Fir Forest District, 1972 Board of Forestry field trip.

State Forests

State Forest land was reduced to 69,452 acres in 1972. Some 31 acres adjoining Boggs Mountain State Forest were acquired from the Bureau of Land Management, but 977 acres of Jackson State Forest were traded to the Boise-Cascade Corporation in exchange for 658 acres of beach park lands to be administered by the California Department of Parks and Recreation. In November, the State Board of Forestry adopted a resolution to transfer Loghry State Forest to the Department of Parks and Recreation.

The State of California vs. Matt Thompson, a case involving timber trespass on and near Jackson State Forest in 1964, was retried in 1972. The jury upheld an earlier decision, ruling in favor of Matt Thompson. Timber and miscellaneous forest products brought a record \$1,990,546 for 37,480,000 board feet in 1972. The timber sales program had six major timber sales, two major Christmas tree sales, 237 minor forest product sales, and several miscellaneous sales. Of the six major timber sales, two had unusual demonstrational features. One sale featured the silvicultural and economical aspects of two treatments included in the Southern Area rules of the Redwood Forest Practice District. The other sale took place near a well used recreational facility. An alternate road was built to the same site, keeping the visual impact of heavy logging to a minimum.

Because of timber harvesting operations, several miles of roads were improved and maintained and four miles of new roads were developed.



Timber was harvested adjacent to this meadow as part of a major state forest timber sale.

A 100,000 board foot commercial thinning in an even-aged stand of ponderosa pine was harvested on an experimental basis. The thinning involved removing trees from 8 to 22 inches in diameter breast height. The average tree contained 115 board feet with utilization to a 6 inch top for sawlogs and to a 3½ inch top for fence posts. This type of sale was shown to be economically feasible with prevailing market conditions.

Other demonstrations and experiments were conducted on 19 approved projects. Three new projects were started and the results of two completed projects were published as State Forester Notes.

In-lieu taxes paid by the State to the counties for state forest properties increased 30.3 percent in the

1971-72 tax year. The \$146,804 paid during 1971-72 brings land and timber taxes paid since the forests were acquired to a total of \$1,037,028.

State Forests provide valuable habitat for fish and wildlife. Hunting and fishing are major attractions. In 1972, recreational use increased to 68,050 visitor-days and more than 52,850 camper-days. State forest lands provide the public with a dynamic environment for outdoor activities and experiences.

Forest Pest Control

Forest pests (insects, animals and disease) account for losses totaling more than one billion board feet per year—four times the loss from fire. The Division helps to protect California timberland from forest pests by cooperating with private landowners and the federal government in a program of detection, appraisal, and control of forest pest damage.

Bark beetles cause the most damage of all forest pests, but in northern California their populations are low. In the southern part of the state, insect numbers increased rapidly during the first part of the season then leveled off. Seven bark beetle control projects were conducted in 1972 and 5,030 trees were felled and treated.

White fir sawflies caused scattered defoliation in the Cascade and Sierra Nevada ranges, and surveys indicate that problems from this insect should decrease in 1973.

The Division cooperated in the bark beetle sex attractant program at McCloud Flat. This project will be continued in 1973, but attempts to suppress western pine beetle populations will be discontinued. Efforts will be concentrated on developing survey methods and aerial photo work.

The black staining root disease, *Verticicladiella wagnerii* infected several new host trees: western white, sugar, and knobcone pines. In a cooperative effort to curb the spread of this disease, the U. S. Forest Service, the University of California and the Division established several control plots in Jackson State Forest. A special blister rust control project on Mountain Home State Forest, Tulare County involved the removal or pruning of 1,413 infected sugar pines. Another 4,550 non-infected trees were also pruned.



A western white pine infected with black staining root disease near Gasquet, Del Norte County. This is the first time it was found infecting this species of pine.

Brush Range Improvement

Fire was used in the management of 31,172 acres of brush range land in California during 1972. Permits were issued to 74 individuals. Some 59 controlled burns were made, including 10 cooperative projects involving two or more landowners. The Division's fire control forces stood by during the burning of 20,620 acres.

Range and watershed specialists advised more than 350 landowners to use fire in combination with another treatment—mechanical preparation, seeding, and sprout control. As a result, 3,571 acres of brush range land were treated with mechanical equipment prior to burning (fig. 1) and 7,367 acres were seeded with forage plants, a mixture of grasses and legumes. Reburning took place on 16,472 acres.

Three permits were issued for game habitat improvement on 260 acres, and three were issued for dual purpose burning, both livestock and game management, on 903 acres. In addition, 19 winter burns covered 528 acres; 405 acres were mechanically prepared for burning and 65 were seeded with forage grasses.

Activity in the controlled burning program was below the past five year level. Several planned burns were cancelled because of unfavorable weather conditions, leaving 22,399 acres applied for but not burned. Since the Range Improvement Program began in 1945, about 2.5 million acres of California brushlands have been burned, including about 0.6 million acres reburned to maintain a range forage cover.

The Division's cooperative range improvement field study program is conducted to test methods and demonstrate practices. Findings are published periodically under the title "Range Improvement Studies" and are available to the public.

Reforestation and Nurseries

Reforestation efforts in California increased for the fourth consecutive year. More than 29,100 acres were reforested, including 18,600 acres seeded by helicopter. This was an increase of 2,500 acres over the 1970-71 total.

The Division's three nurseries produced 4,670,000 seedlings compared with 4,359,000 produced the previous year. An additional 416,000 trees were purchased from U.S. Forest Service nurseries to supplement the supply to California landowners.

Cone production in California forests was a near failure in the fall of 1972 and division nurseries relied on seed from previous years' collections.

The Advisory Committee to the State Forester on Reforestation Methods and Procedures held two field meetings. In May the Committee met in southern California to review reforestation efforts on old and recent burns. Los Angeles County Department of Forester and Firewarden is having success on well-prepared sites at higher elevations. Plantings observed on better sites of the 1950 Conejos burn in and bordering Rancho Cuyamaca State Park in San Diego County, were well established; on poorer sites brush had reinvaded.

U.S. Forest Service crews planted seedlings on the 1970 Laguna Mountain burn in San Diego County. At their September meeting, the committee studied forest regeneration projects in the McCloud, Siskiyou County area. They visited three industrial forests to view various reforestation methods, including: intensive site preparation for natural true fir regeneration, helicopter seeding with Douglas-fir and ponderosa pine, and hand planting seedlings by contract reforestation crews. Most methods have been successful.

The Division continued five reforestation studies. One at Webber Lake in Sierra County indicated that the bumper cone crop in 1967 produced more seedlings than a similar 1971 crop. Conditions in the spring and summer of 1968 were more favorable than those of 1972.

The Winton Study in Amador County revealed that of several methods tested to control mountain misery, a dense low growing ground cover, burning followed by spraying with an invert emulsion of 2,4,5-T gave the best control.

Samples of competing vegetation, taken from plots on the Blue Canyon Study in Placer County, were dried and weighed by the Soils Department at University of California, Davis. Results indicated that scalping at least the soil surface is necessary to reduce competing vegetation for successful reforestation by seeding.

In a planting test at Growlersburg Conservation Camp, El Dorado County, the survival of six species of bare root seedlings was compared to the same species of container seedlings. Bare root survival was 55 percent, and container 65 percent.

Five lifting dates for white fir and Sierra redwood seedlings grown in the Magalia Nursery, Butte County, were tested at Davis in a controlled temperature water bath to determine which date, or dates, would give the highest root regeneration potential. January appeared to be the best time for white fir and February for Sierra redwood.

Considerable progress was made on a project to genetically improve seed stock for CDF nursery production. A Forester II located at Davis Headquarters Nursery, Yolo County, was assigned to the project. Project matching funds are provided by the federal government under Title IV of the Agricultural Act of 1956. Twenty acres containing six species of root stocks were planted in two locations for later grafting of scions from superior parent trees. Surveys for superior trees were made in the Sierra Nevada-Cascade Mountains from Tuolumne County to Siskiyou County and in the coast area from Monterey County to Humboldt County. More than 130 trees were selected for the program. Progeny testing of the knob-cone-Monterey pine cross, and intraspecific ponderosa pine hybrids was continued. This included three stages in the testing program:

1. Controlled pollination to develop the hybrid seed.
2. Raising seedlings from hybridized seed.
3. Planting progeny seedlings in numerous locations throughout northern California to observe survival and growth habits.

Cooperation from the forest industry and the U.S. Forest Service has aided in the progress of the tree improvement program. The California Forest Protective Association and Kimberly-Clark Corporation have provided funds.

California's need for forest products require that its timberlands be managed and protected for a high level of production, while at the same time preserving the environment.

Small forest property ownership encompasses nearly 3.5 million acres and involves over 30,000 ownerships. Since most landowners do not possess the professional skills to manage properties, the division has located ten forest advisors throughout the state. They provide advice about forest and fire laws, prevention of soil erosion, protection of aesthetic values and environmental problems. They also confer with landowners on the ground about forest protection, reforestation, harvesting and marketing of forest products, recreational development and other management activities, and they can assist counties and other agencies in land planning.

The federal government terminated the Rural Environmental Assistance Program at the end of 1972. Forest advisors had provided technical assistance and guidance for the two forestry practices within the program.

The forest advisors provided 1,948 on the ground assists, including the planting or direct seeding of 6,197 acres and the thinning and pruning of 2,900 acres of forest trees for improvement of the stand.

In mid year the Division ceased to provide a professional forester as consultant to government entities within the Lake Tahoe Basin. Technical assistance is now provided by the forest advisory program.

The Division continued to participate in the North Cal-Neva Resource Conservation and Development Program in Lassen and Modoc counties. The Division's representative acts as the secretary for the Woodland Committee. Because of this involvement, a second post operator began operating in 1972, and negotiations are underway to obtain a pressure treating facility for the area to open markets for the thinning projects. A second project was approved in 1972, the North Coast R.C. & D. in District V. Negotiations between the Division and the U.S. Forest Service for planning work on this project are underway.

Due to a heavy demand for the publication "Markets for Woodland Products," it was reprinted with the section on young growth log prices updated to reflect the tremendous surge in prices between 1971 and 1972.

Emergency Revegetation

The Cooperative Emergency Revegetation Program is authorized and conducted under Section 4675-4677 of the Public Resources Code. It provides for seeding burned-over watershed lands to establish an emergency cover of protective vegetation for preventing soil erosion, flooding, and downstream sedimentation detrimental to public health and welfare. Establishing a temporary vegetative cover of herbaceous plants may

reduce or prevent excessive runoff until the native cover is restored by natural means.

During the 1972 fire season, three major fires, burning brush-covered watersheds in central and southern California, required emergency treatment. The three fires burned 10,430 acres of public and private land. Field examinations determined that 7,416 acres of prime watershed needed seeding. A total of 3,397 acres of public land and 2,019 acres of private land were seeded under the state's cooperative emergency revegetation program (table).

Emergency Revegetation Activity in 1972

Fire	Date	Total Acres	Lands to be seeded (acres)		Total
			Public	Private	
Klondike *	May 14	2,572	762	1,086	1,848
Molera	August 1	4,300	1,630	380	2,010
Vista	August 22	3,558	1,005	553	3,558
Total		10,430	3,397	2,019	7,416

* California Division of Forestry conducted project.

Since 1956, 125 separate projects have been conducted and 566,643 acres of critical watershed lands treated to secure the exposed soils against movement under high intensity winter rains. The Division watershed specialist evaluates the results of these seedings and measures soil erosion and debris damage.

PUBLICATIONS OF 1972

Reports of Division activities and research are available in a variety of publications. Those listed below were distributed during 1972. They were prepared by members of the Division, or resulted from cooperative projects with other agencies. All are directly related to work with the Division of Forestry.

PAPERS AND REPORTS PROCESSED BY DIVISION OF FORESTRY AND DEPARTMENT OF CONSERVATION

- "Annual Forest Practice Report—1971." 7 pp.
- "California State Forests—1971." 11 pp.
- "Emergency Revegetation of Burned Watersheds—1971." 14 pp.
- "Forest Nurseries Annual Report, 1971–72." 8 pp.
- "Brushland Range Improvement Annual Report—1971." 22 pp.
- "Reforestation Studies—1971." 18 pp.
- "Production of California Timber Operators in 1970." State Forest Note No. 47. 6 pp.
- "California Cone Crop for 1972." State Forest Note No. 50. 7 pp.
- "Ponderosa Pine Growth Response on a California Division of Forestry Fuelbreak." State Forest Note No. 49. 2 pp.
- "Use of Annual Ryegrass and Urea for Post Logging Erosion Control on Jackson State Forest." State Forest Note No. 48. 4 pp.
- "Emergency Revegetation—A Review of Project Evaluation 1956–1970." 21 pp.
- "Plantation Christmas Trees for Southern California." Revised 1972. 28 pp.
- "Recommendations to Solve California's Wildland Fire Problem" (Task Force on California's Wildland Fire Problem). California Division of Forestry, 63 pp., 1972.
- "1971 Wildfire Activity Statistics." 176 pp.
- "A Review of Redwood Harvesting," by Verne R. Osburn and Phillip Lowell. 28 pp., illus.
- "California Ecology Corps Annual Report—July 1971–June 1972." 15 pp.
- "The Division of Forestry in the Conservation Camp Program—1972." 26 pp.
- "Preschool and Elementary Fire Prevention and Conservation Education Program," by Richard Ernest and Rex Griggs. Third Edition.

PRINTED ARTICLES AND BOOKS
(BY DIVISION PERSONNEL)

- "California's 1971 Fire Weather Severity", by Rex Hess and William Innes. *California Fire Control Note* No. 27, 1972. 7 pp., 7 figs.
- "Creeping Sage—A Slow Burning Plant Useful for Fire Hazard Reduction", by C. B. Phillips, L. E. Gunter, G. E. McClellan, and E. C. Nord. *California Fire Control Note* No. 26, 1972. 8 pp.
- "Forest Fuel Accumulation—A Growing Problem," by Marvin Dodge. *Science*, Vol. 177, pp. 139-142, July 14, 1972.
- "Reforestation Practices for Conifers in California," by Gilbert H. Schubert and Ronald Adams. 1971, 355 pp.

PUBLICATIONS RESULTING FROM
COOPERATIVE EFFORT OF
DIVISION OF FORESTRY

- "Fire Prevention in California's Riverside County Headstart Project—An Evaluation," by William S. Folkman and Jean Taylor. USDA Forest Service Research Paper PSW-79/1972. 30 pp., illus.
- "Effects of Ammonium Sulfate and Ammonium Phosphate on Flammability," by Charles W. George and Aylmer Blakely, USDA Forest Service Research Paper INT-121. Intermountain Forest and Range Experiment Station. 26 pp.
- "Fire-Weather Observers Handbook," by William C. Fischer and Charles E. Hardy. USDA Forest Service. Intermountain Forest and Range Experiment Station. 152 pp.
- "Low Level Wind Maxima in the 1969 San Mateo and Walker Fires," by Bill C. Ryan, George R. Ellis, and Donald V. Lust. USDA Forest Service Research Paper PSW 75/1971. Pacific Southwest Forest and Range Experiment Station. 10 pp.
- "National Fire Danger Rating System," by John E. Deeming, James W. Lancaster, Michael A. Fosberg, R. William Furman, and Mark J. Schroeder. USDA Forest Service Research Paper RM-84. Rocky Mountain Forest and Range Experiment Station. 165 pp.
- "Progress Reports on Fire Management Systems, Fire-climate Studies, Fire Prevention Research, and Fuel-Break Research" (for period July 1, 1971 through June 30, 1972). USDA Forest Service. Pacific SW Forest and Range Experiment Station.
- "The Fire Environment Concept," by Clive M. Countryman. USDA Forest Service. Pacific SW Forest and Range Experiment Station. 12 pp.
- "Forest Pest Conditions in California—1971," California Forest Pest Control Action Council—CDF. 19 pp.
- "Wildland Soils Vegetation and Activities Affecting Water Quality," by Marvin Dodge. 255 pp. Water Quality Control Board.



